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COMMITTEE ON EDUCATIONAL RESEARCH
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# *Editorial Comment*

The final issue of Volume XIV of the Journal includes articles on a range of topics. There are two articles on concept formation in young children, an article considering variables related to the social status of high school students, a discussion of the relationships among measures on male elementary education students, and an article dealing with the interaction among members of school staffs. This range of topics illustrates the broad responsibilities of educators who must constantly be concerned with the education of children and youth, and with those who undertake the task of teaching.

Everett and Armstrong present an interesting study of the responses of young children to concrete and pictorial materials. Their careful analysis, taking account of the interaction among the variables, leads to more definite implications concerning the selection and use of concrete and pictorial representations in helping the young to form concepts.

Liedtke and Nelson approach the question of concept formation in young children from yet another point of view. Liedtke, who is fluent in two languages and has an elementary reading ability in a third, was concerned about the apparent evidence that the bilingual child is handicapped in concept formation. The findings of this study, if interpreted within the limitations as set out by the authors, may add another dimension to the study of bilingualism and concept development.

Chabassol and Thomas present the findings of an investigation of the relationships among anxiety and performance in teacher education for male students enrolled in elementary education. Studies of sub-groups in which it is difficult to get the prized "large N" are rarely reported in educational research. These authors report a companion study to their investigation of female elementary education students which was reported in an earlier issue of the Journal.

The study by Zentner and Parr includes an examination of the variables which seem to be related to high social status among high school students. These results seem to be incompatible in some respects with the results of similar studies of American high school students.

Miklos and Brietkreuz discuss the use of an interaction model for examining the structural characteristics of schools. The model most frequently used to analyze these characteristics is the bureaucratic model. The authors conclude that the analysis of communication and interaction patterns within school staffs may be used with other than small samples and that the data from such an analysis are a useful supplement to information gathered in a study of the bureaucratic dimensions of schools.

P.A.L.

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*The study compared young children's responses to concrete and pictorial modes of representing perceptual data. Concrete materials were more effective than pictorial materials, with age significantly affecting the level of response. Sex and socio-economic status had no significant effect on level of response.*

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# Responses of Young Children to Two Modes of Representation[1]

The relationships among language, thought, and reality can be exemplified most clearly in concept formation. Working with concrete perceptual data, the young child first identifies then labels the stimuli of his environment. Later, he assembles categories and names them, building a rich fabric of meaning around the concepts and their verbal tags. The child's definition of a word suggests the level reached in this search for more concentrated, i.e., more abstract, meaning. Thus, cognitive development matches linguistic growth, paralleled by a movement to increasing use of more abstract stimulus materials until pictorial representations and even words can be manipulated, categorized, and defined. The processes by which the child uses reality to think and to produce ever more sophisticated language are not well known but can be observed to some degree through a study of language. The fluency, precision, and abstractness of his language should be an index of the power of the child's thought.

It is, then, well known that the very young child first uses concrete materials as a source for perceptual data and that, increasingly, more abstract materials are substituted. It was the purpose of the present study to determine whether concrete or pictorial representations would evoke more meaningful responses from young children. It was hypothesized that more meaningful responses would be elicited by the use

1 Based on an unpublished M.Ed. thesis by Lorene M. Everett, Department of Elementary Education, The University of Alberta.

of concrete stimuli and that the quality of the responses would be conditioned by age, sex, and socio-economic status.

### *Sample*

The sample of sixty children consisted of ten boys and ten girls at ages three, four, and five, with half of the children at each age level coming from low socio-economic status (LSES) homes and half from high socio-economic status (HSES) homes. Socio-economic status was determined by combining the occupational rating of both parents as listed on the *Blishen Occupational Scale* (1961). Children from the two extremes of the socio-economic rating scale were selected from the study, with those considered HSES coming from homes where the parents were employed in professional occupations, many having university or highly specialized training, while parents of those considered LSES were employed in unskilled occupations. All subjects were attending preschool centres in Edmonton, Canada.

### *Test Procedure*

Eighteen objects represented in two different modes were: shoe, saw, apple, cow, turtle, stove, dress, airplane, scissors, bed, bread, train, corn, elephant, truck, hammer, jeans, and chair (Figure 1). The two modes of representation were (*a*) concrete (toy representations of familiar objects), and (*b*) pictorial (black and white line drawings).

In order to assess the ability of the children to respond to the two modes, three tasks were administered individually to each child, first in one mode of representation and three weeks later in the other mode, with the order of presentation being varied systematically. Responses were recorded on a dictaphone, transcribed on cards by a qualified stenographer, and scored by the experimenter. Reliability of scoring was ascertained by interscorer agreement.

As a means of establishing rapport with each subject, several stimulus objects, in whichever mode was being used in the test situation, were displayed, manipulated, and talked about by the subject and the investigator prior to Task 1.

For Task 1 (Definition) the child was presented with a stimulus cue (either concrete or pictorial), asked to name it, then encouraged to tell as much about it as he could. Responses to Task 1 were scored according to the modified *Feifel-Lorge Qualitative Scale* (1950) which was revised on the basis of results of a pilot study which had utilized several rating scales as a means for evaluating children's definitional responses (Everett, 1968). Each response was scored according to the following scale:

(a) Synonym Category (e.g. orange—a fruit) =3 points,

(b) Explanation, Use, Description Category (e.g. orange—you eat it; it grows on trees) =2 points,

**Fig. 1.** Examples of stimulus materials in concrete and pictorial modes of representation.

(c) Demonstration, Repetition, Illustration and Inferior Explanation (e.g. puddle—a puddle of water; eye—point to eye) =1 point.

A score was obtained for each cue stimulus by giving credit for all responses elicited by that stimulus.

A count of all the scorable responses was also recorded in order to determine what, if any, relationship there was between quality and quantity of responses.

In Task 2 (Categorization), twelve stimulus cues were placed on a table, the child was asked to label each object, then six more stimuli were presented, one at a time, with the child being asked in each case to look at all the pictures (or toys) that were on the table and find the ones that were the same as or like the stimulus. The subject was encouraged to look carefully at all stimuli and be quite certain that he had included all those he thought belonged together.

Upon indicating that he had finished, the subject was asked to explain the reason he had grouped together the items he had selected.

The subject received credit in Task 2 (*a*) for the number of items placed in a logical category, and (*b*) for the explanation given for the grouping according to *Annett's Scheme of Classification* (1959) as follows:

(a) Class name (e.g. animals, tools) =4 points,
(b) Similarities (e.g. corn, apple, bread—eat all of them) =3 points,
(c) Contiguity (e.g. corn, cow—the cow eats the corn) =2 points,
(c) Enumeration (e.g. the cow is on a farm, the turtle is in the water) =1 point.

In Task 3 (Identification), six cue stimuli were placed upon a table. Three definitions in the form of questions had been prepared for each of the six cue stimuli, based on a hierarchy of levels of conceptualization from abstract to concrete. The experimenter then presented the child with the highest level definition for each of the cue stimuli, one at a time, asking the child to indicate which of the six stimuli on the table had been defined. The child was free to identify the correct stimulus by naming, pointing to, or using any means that indicated an understanding of the appropriate object.

The subjects were able to identify each stimulus at one of three levels ranging from concrete to abstract, with a score of three obtained for identification at the most abstract level; two points at the functional level; and one at the concrete level.

### *Results and Discussion*

Responses to the three tasks were subjected to three-way analyses of variance with repeated measures on the last factor. The .05 level of significance was used to evaluate the findings. Age, mode of representation, socio-economic status and sex were the variables considered. A summary of the findings follows.[2]

[2] Complete information on the statistical analyses may be obtained from the authors.

1. Age: On each of the tasks, age was found to have a statistically significant effect, with an increase in age resulting in an increase in level of achievement. Upon examining mean scores it was discovered that there were substantial gains on quality of definitions given; from age three to four (concrete—gain of 6 points; pictorial—gain of 8 points), and from four to five (concrete—7; pictorial—8). A smaller increase was found in quantity of scorable responses between three and four years (concrete—3; pictorial—3) and between four and five years (concrete—4; pictorial—4). These results seem to indicate that although the quantity of responses increases steadily with age, the quality increases more rapidly, resulting in superior definitions given in fewer words as children get older (Figure 2).

The gains made from one age level to the next on the categorization

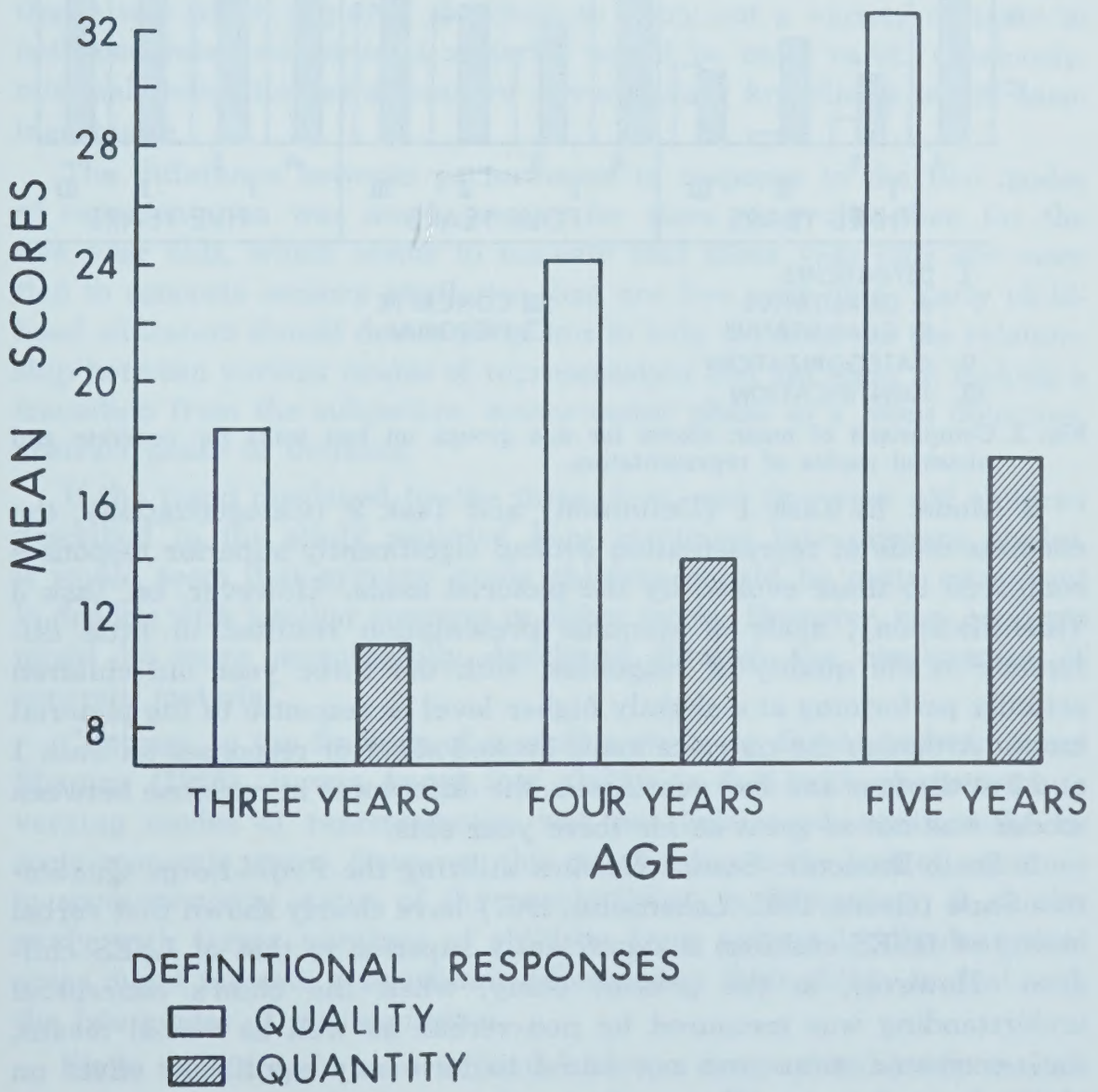


**Fig. 2.** Comparison of mean scores for age groups on quality and quantity of definitional responses.

task were also significant, with the ability to produce and explain groupings at a higher level of conceptualization increasing with age.

Similarily, but to a lesser degree, the ability to identify at a more abstract level increased with age (Figure 3).

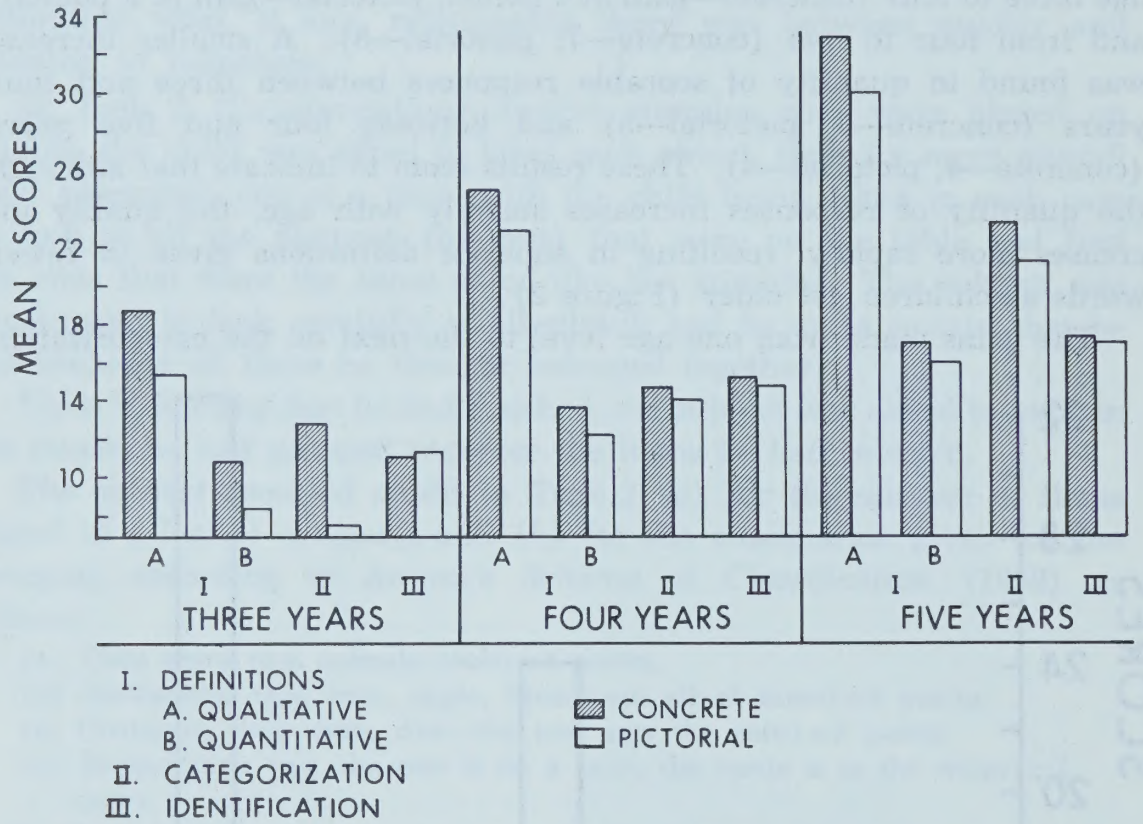


**Fig. 3.** Comparison of mean scores for age groups on test tasks for concrete and pictorial modes of representation.

2. Mode: In Task 1 (Definition) and Task 2 (Categorization), the concrete mode of representation evoked significantly superior responses compared to those evoked by the pictorial mode. However, on Task 3 (Identification), mode of stimulus presentation resulted in little difference in the quality of responses, with the three year old children actually performing at a slightly higher level in response to the pictorial mode. Although the concrete mode evoked superior responses on Task 1 and 2 at the four and five year levels, the differences in response between modes was not so great as for three year olds.

3. Socio-Economic Status: Studies utilizing the *Feifel-Lorge Qualitative Scale* (Grant, 1965; Labensohn, 1967) have clearly shown that verbal ability of HSES children is signifciantly superior to that of LSES children. However, in the present study, when the child's conceptual understanding was measured by non-verbal, as well as verbal means, socio-economic status was not found to have any significant effect on ability to perform in either mode.

4. Sex: No sex differences were found in ability to deal with either mode of representation on any of the three tasks.

### *Conclusions and Implications*

As concrete materials were found to elicit greater conceptual understanding in young children than did pictorial materials, it would seem important that teachers of preschool and primary children recognize this difference in stimulus potential. Young children's difficulties in dealing with mathematical and language symbols may arise from a lack of ability to deal with pictorial stimuli. Thus, it would seem important that numerous experiences with concrete objects are provided in early childhood education programs.

Even though most of the subjects could correctly label all of the stimuli in both modes, this did not assure that they could talk meaningfully about or classify the cue stimuli. Therefore, if a measure of a young child's conceptual understanding is desired, it would seem likely that a test which required the child to carry out a variety of tasks in both concrete and pictorial material would be most valid. Obviously, minimal recognition as a measure of vocabulary knowledge would seem inadequate.

The difference between performance in response to the two modes of representation was much greater for three year olds than for the five year olds, which seems to indicate that three year olds are more tied to concrete sensory attributes than are five year olds. Early childhood educators should devise programs to help children see the relationship between various modes of representation and aid them in making a transition from the subjective, sensor-motor phase to a more objective, abstract phase of thinking.

If the trend displayed by the three, four, and five year old children described in the study reported here continues into primary grades, it would seem that primary grade children should be quite competent in dealing with familiar concepts in either mode. However, new concepts might be more meaningfully developed through the employment of concrete material.

Contrary to the findings of a similar study by Sigel, Anderson, and Shapiro (1966), it was found that ability to deal with phenomena in varying modes of representation was not influenced significantly by socio-economic status. However, this may be due to the lack of extremes in socio-economic status of the people living in Edmonton. A similar study with larger numbers of children from extremely disadvantaged areas might indicate a significant difference in their ability to deal with the two modes of representation.

Since some trends were indicated here, a longitudinal study including a greater span of years might serve to confirm present indications and, also, to determine the influence of such variables as sex and socio-economic status.

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*Two samples of Grade One pupils, one monolingual and the other bilingual, were tested on a specially constructed Concepts of Linear Measurement Test based on Piaget's test items. The bilingual sample proved to be significantly superior to the monolingual sample on the concept formation test.*

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# Concept Formation and Bilingualism

## *Introduction*

Research reports on bilingualism are numerous, and most investigators have dealt with the relation of bilingualism and intelligence. In one of the more recent studies (Peal and Lambert, 1962) it was reported that bilingualism has favourable intellectual consequences. The study conducted by these authors yielded the following results: in a comparison of bilingual and monolingual children, the bilinguals were intellectually superior, possessed greater verbal skills, exhibited greater mental flexibility, were more facile at concept formation, and achieved higher grades in school. It was the purpose of the study reported here (Liedtke, 1968) to consider just one of these stated results and test for the effects of bilingualism on concept formation.

## *Concept Formation*

Perhaps the greatest quantity of work in the field of concept formation has been conducted by the Swiss psychologist Jean Piaget. He has concerned himself not only with the learner, but also with the substance to be learned and its structure or logical organization. With his ingenuous methods and experiments he has probed into the growth of children's concepts in a variety of areas. In his books on number (1952) and geometry (1960) Piaget makes brilliant suggestions as to how concepts develop out of simple behaviour patterns, and how a basic repertoire of numerical and geometric concepts is formed. His

investigations help us realize that children must assimilate more and more experience in order to make valid generalizations later. The results of his experiments vividly demonstrate that the development of mathematical concepts and ideas is a long and slow process.

Concept formation represents a major part of intellectual development. According to Piaget's theory, intellectual development proceeds through qualitatively distinct stages that occur in a definite sequence. During each stage the child acquires the abilities that prepare him for the next stage. The rate of preparation, according to Piaget, is determined by four factors: maturation, experience, social interaction, and equilibration. Experience and social interaction are cultural rather than genetic factors. There is an implication that the sequence of stages is fixed, but that the ages at which they occur is not. However, Piaget's developmental approach to behaviour change "is characteristically not concerned with any systematic exploration of other independent variables which may temporarily accelerate or retard the appearance of the behavior studied [Flavell, 1963, p. 17]."

Experience and social interaction are the two main factors responsible for individual differences or retardation and acceleration of concept formation. Adler (1966) in commenting on proposed revisions of the arithmetic program concludes that acceleration of learning is not ruled out by Piaget's theory of stages in the development of thinking. At least two of the contributing factors, the experience acquired in interaction with the physical environment and the influence of the social milieu, are subject to our control since they are cultural rather than genetic.

### *Bilingualism*

Many children are brought up in a bilingual home environment. They learn two languages simultaneously at a very early age. Thus, they are exposed to an environment that is in a way unique and complex. Most of them have two 'worlds' of experience. The factor of social interaction in Piaget's developmental theory includes the explicit and implicit teaching of the child by other people in his environment. Learning two languages or two symbols for every object implies a great degree of explicit teaching. One might hypothesize that a young child learning two languages at the same time is exposed to a greater amount of social interaction when compared to someone his own age learning just one language. The question arises whether the bilingual child's experiences are different enough to effect his intellectual development in any significant way.

As mentioned previously, there exist numerous studies that have been concerned with bilingualism. Jensen (1962) in a two article summary lists many disadvantages of bilingualism ranging from speech

handicap and intellectual immaturity to emotional instability and social maladjustment. However, he points out that most of these results came from studies that used varying definitions of bilingualism, few subjects, and a great variety of procedures, and argues that bilingualism may indeed be an advantage to the child's intellectual development.

Peal and Lambert (1962) present a thorough review of studies on bilingualism. They found that most of the reports support the detrimental effect of bilingualism on intellectual development, a few found no significant difference between monolinguals and bilinguals, and only two studies concluded that bilingualism has favourable intellectual consequences. Also stated in their report is the fact that many of the studies failed to define monolingualism and bilingualism, did not control for socioeconomic status differences, compared different age groups or failed to consider the educational background of their subjects. A carefully controlled study by the investigators contradicted much of the existing evidence about bilinguals. In comparing the intelligence of bilinguals and monolinguals they found that on the tests administered the bilinguals scored significantly higher on all verbal and most non-verbal parts of their tests. On none of the subtests did the monolinguals score higher than the bilinguals. Most bilinguals achieved higher grades in school. The bilinguals possessed greater verbal skills, exhibited greater mental flexibility and they were more facile at concept formation.

## *The Study*

### *Purpose and Hypotheses*

It was the purpose of this study to consider the experience of becoming bilingual at any early age and to test for its effects on mental development. A comparison of certain aspects of concept development of bilingual and monolingual children was then made. To make the comparison a test on concepts of linear measurement was constructed to serve as the main instrument. The test consisted of six subtests which dealt with the following aspects of linear measurement: (*a*) reconstructing relations of distance, (*b*) conservation of length, (*c*) conservation of length with change of position, (*d*) conservation of length with distortion of shape, (*e*) measurement of length, and (*f*) subdividing a straight line. Each of the sub-tests has items similar to items devised by Jean Piaget (1960, pp. 67-149). The subtests were used to find out how children judge distances and how they come to an understanding of conservation and measurement of length.

The results of the *Concepts of Linear Measurement Test* were used to test the following hypotheses:

When adjustments are made for differences in age, kindergarten attendance, sex, intelligence, and socioeconomic status:

(*a*) Monolingual and bilingual children do not differ in their understandings of linear measurement concepts (Total Test).

(b) Monolingual and bilingual children do not differ in their ability to conserve length (Subtests 1-4).
(c) Monoglingual and bilingual children do not differ in their ability to measure length (Subtests 5 & 6).

The data gathered on age, kindergarten attendance, sex, intelligence, and socioeconomic status were also used to test whether any one of these was a significant factor in predicting scores on the *Concepts of Linear Measurement Test.*

*The Samples*

The two samples required for this study came from six schools of the Edmonton Separate School System. Nine grade one classrooms were made available.

The criterion for choosing the monolingual subjects was that they had no functional knowledge of a second language and that only one language was spoken at home. One hundred thirty-seven pupils from six of the classrooms met this criterion. A table of random numbers was used to select fifty subjects. The resulting sample consisted of twenty-five girls and twenty-five boys.

Bilinguals were defined as children who had used two languages before entering school and who were exposed to both languages at home. The classroom teachers helped in selecting the fifty subjects for the second sample from the remaining three rooms which were set up for bilingual children. The bilinguals received instruction in English and French, whereas the monolinguals were instructed solely in English. There were twenty-five females and twenty-five males in the bilingual sample.

*Data Collected*

The *Concepts of Linear Measurement Test* was administered individually to each subject during the month of May, 1968.

Each subject's age was calculated to the nearest month on the day of testing. The socioeconomic status for each subject was established by referring to the Occupational Class Scale constructed by Blishen (1961). A numerical value was given to each subject according to the father's occupation. All the subjects had written the S.R.A.—Primary Mental Abilities Test (Thurstone, revised 1962, Grades K to 1) a month prior to the investigation.

*Results*

To find out whether the two samples differed significantly on the basis of age, socioeconomic status and intelligence, *t*-ratios were calculated. The results of the *t*-tests are shown in Table 1.

A check was made on each subject's pre-school experience. Fifty-two per cent of the monolinguals and seventy-four per cent of the

TABLE 1

T-TESTS COMPARING MEANS OF THE

SAMPLES ON AGE, SEX, AND INTELLIGENCE

| | Means | | |
|---|---|---|---|
| | Monolinguals | Bilinguals | $t^a$ (calculated) |
| Age (years) | 6.85 | 6.82 | 0.435 |
| Socioeconomic Status | 49.16 | 49.56 | 0.265 |
| Intelligence | 107.40 | 104.22 | 1.325 |

[a] $t$ (.05) = 1.985

bilingual sample had attended either kindergarten or playschool. Since the difference in attendance for the two samples was rather large, the significance of kindergarten attendance in predicting scores on the *Concepts of Linear Measurement Test* was checked. Independent of the group membership, the kindergarten attendance and the scores on this test were correlated. The resultant correlation coefficient of 0.141 was not significant at the .05 level.

The test on concepts of linear measurement was scored and the means, variances, and standard deviations for the two samples and the total group were calculated. The results are shown in Table 2.

TABLE 2

MEANS, VARIANCES AND STANDARD DEVIATIONS OF

'CONCEPTS OF LINEAR MEASUREMENT TEST' SCORES FOR

MONOLINGUALS, BILINGUALS, AND TOTAL SAMPLE

| | Mean | Variance | Standard Deviation |
|---|---|---|---|
| Monolinguals | 10.72 | 13.88 | 3.72 |
| Bilinguals | 13.72 | 13.72 | 3.70 |
| Total Group | 12.22 | 15.76 | 3.97 |

Multiple linear regression analysis was used to analyze the results in terms of the research hypotheses. The results of the analysis are summarized in Tables 3 and 4.

TABLE 3

MULTIPLE-LINEAR REGRESSION ANALYSIS OF THE HYPOTHESES

| Source | Degrees of Freedom Num. | Den. | F-Ratio |
|---|---|---|---|
| Total Test | 1 | 94 | 16.04[a] |
| Part 1 (Conservation) | 1 | 94 | 8.41[a] |
| Part 2 (Measurement) | 1 | 94 | 18.08[a] |

[a] $F_{.05}(1,94) = 3.95$

TABLE 4

RESULTS OF ANALYSIS FOR INDEPENDENT VARIABLES

| Source | Degrees of Freedom Num. | Den. | F-Ratio |
|---|---|---|---|
| Age | 1 | 99 | 0.73 |
| Kindergarten Attendance | 1 | 99 | 2.02 |
| Sex | 1 | 99 | 2.87 |
| Intelligence | 1 | 99 | 4.16[a] |
| Socioeconomic Status | 1 | 99 | 3.85 |

[a] $F_{.05}(1,99) = 3.94$

## *Conclusions and Discussion*

On the basis of testing the research hypotheses the following conclusions may be drawn:

(*a*) The mean for the bilingual sample on the *Concepts of Linear Measurement Test* was significantly higher than the mean for the mono-

lingual sample. This result is in agreement with Peal and Lambert's (1962) finding that bilingualism has favourable effects on intellectual functioning. From their study they concluded that bilinguals were more facile at concept formation.

(*b*) The mean for the bilingual sample on the 'Conservation' part (Part I: subtests one to four) of the test was significantly higher than the mean for the monolingual sample. If the higher score implies that the concept is more advanced and more highly developed, the bilingual children manifest a better understanding of the concept when compared with monolingual children of the same age.

(*c*) The mean for the bilingual sample on the 'Measurement' part (Part II: subtests five and six) of the test was significantly higher than the mean for the monolingual sample. This suggests that the measurement concept, too, had developed to a more advanced stage in the bilingual subjects.

These results seem to indicate that the linguistic and cultural experience of the bilinguals is an advantage. The evidence would seem to demonstrate the importance of social interaction and social environment as ingredients of experience. Intelligence factors necessary for concept formation seem to be developed to a greater extent in the bilingual subjects.

Of all the independent variables considered only intelligence (I.Q. scores) was found to be a significant factor in predicting scores on the *Concepts of Linear Measurement Test*. This result is in agreement with Almy (1966) who reviewed several studies that related intelligence and results of Piagetian tests of concept formation. She concluded that the safest generalization one can make is that to some degree "brightness" pays off. Pelletier (1966) also found that children with high mental ability were definitely more advanced in their development of the concepts of linear measurement than children with low mental ability.

It is probable that the chronological age range was not large enough and the socioeconomic levels represented here were not diverse enough to produce any significant correlation with the test score.

The results of this study give rise to several implications. If bilingualism increases intellectual potential and is beneficial to concept formation then a second language should be introduced during the early years when experience and environmental factors are most effective in contributing to the development of intelligence.

The results of this study seem to indicate that becoming bilingual speeds up the normal process of some parts of mental development. According to Peal and Lambert (1962) the speaking of two languages diversifies the intellectual structure. Teachers and administrators who deal with or instruct students who are bilingual should consider that

these pupils could be advanced in the development of certain concepts and make provisions for curricular adjustments which would take such development into account.

The results seem to indicate that bilingual children conserve length before monolinguals do. If this is true for other conservations, it could be that bilingualism accelerates development, and the bilinguals reach the concrete operational stage before the monolinguals do. This of course would have important implications for those who teach such students in the primary grades.

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*A summary of the intercorrelations obtained for scores in anxiety, academic aptitude, academic achievement and teaching performance for 50 male elementary education students. Negative correlations were obtained between scores for anxiety and for all other variables. A comparison with an earlier study based on female students reveals a number of marked differences.*

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# Anxiety, Aptitude, Achievement and Performance in Male Elementary Teachers

The purpose of the present study was to determine the relationship between the non-intellectual factor, anxiety, and the variables academic aptitude, scholastic achievement, and performance in a given area, to wit, classroom teaching. This study is essentially a replication of an earlier study done by the same authors (1967) which utilized a population of female teachers.

## *Method*

Scores on the Taylor *Manifest Anxiety Scale* (MAS) provided a measure of anxiety (Taylor, 1953). Academic aptitude was evaluated by the *School and College Ability Test* (SCAT), and final grade point averages (GPA) served as measures of academic achievement. The subjects used in this study were 50 male elementary student teachers and scores made on the above variables were correlated with final practice teaching grades (FPTG) in each case.

The subjects were in their second year at the University of Victoria and were enrolled in the Faculty of Education. This second year is the professional year for such students and, with the exception of a second year English course, all work is taken in the Faculty of Education. The year previously the students had taken five courses, four from the Faculty of Arts and Science and one, a first year course in educational psychology, from the Faculty of Education.

In their professional year these students are required to teach for a total of about eight weeks. At the end of the practice teaching sessions, a final grade in teaching is calculated for each student teacher. This grade is a composite of the evaluations from eight to twelve cooperating teachers and faculty members who have observed the student's teaching and have provided criticism and advice. Grade point averages are also calculated for each student at the end of the April examination period. This grade point average for professional year students is influenced by the mark received for practice teaching. The latter contributes 33 1/3% to the former, so that a spuriously high positive correlation might be expected between the two scores.

The *Manifest Anxiety Scale* was given to the students in their first term. To the original fifty items of the MAS were added an additional one hundred items not intended to measure anxiety, but designed to mask the true nature of the scale. Taylor's items were arranged in three groups, in the order suggested by Hoyt and Magoon (1954). Those items which Hoyt and Magoon found to be most closely correlated with clinical assessments of anxiety were grouped so as to yield the score $MAS_1$. The items which were next in agreement with clinical assessments of anxiety yielded the $MAS_2$ score. Those items poorest in this respect yielded the $MAS_3$ score. The total scores, $MAS_t$, for all three subtests combined, were also obtained for each subject. All students involved in this study had taken the *School and College Ability Test* on being enrolled at the University of Victoria in their first year and three scores, verbal ($SCAT_v$), quantitative ($SCAT_q$), and total ($SCAT_t$)) were available.

## *Results*

Table 1 provides the following information:

1. All subtest scores on the MAS correlated significantly with each other and with the total MAS score. It will be seen that $MAS_3$, calculated from those items which Hoyt and Magoon found to be the poorest indicators of clinical anxiety, correlate somewhat more poorly with $MAS_1$ and $MAS_2$ than do these subtest scores with each other, and also less well with $MAS_t$ than do $MAS_1$ and $MAS_2$.
2. The twelve correlations between measures of anxiety, MAS, and measures of academic aptitude, SCAT, are evenly divided into positive and negative results. However, whereas none of the positive correlations approach significance, two of the negative ones do, though only at the .05 and .10 levels.
3. $SCAT_v$ and $SCAT_q$ scores are positively related, with significance beyond the .001 level.

TABLE 1

CORRELATIONS BETWEEN MAS, SCAT, GPA, AND FPTG SCORES FOR MALE ELEMENTARY TEACHERS

| | $MAS_1$ | $MAS_2$ | $MAS_3$ | $MAS_t$ | $SCAT_v$ | $SCAT_q$ | $SCAT_t$ | GPA | FPTG |
|---|---|---|---|---|---|---|---|---|---|
| $MAS_1$ | --- | .68* | .55* | .89* | .14 | .09 | -.32# | -.09 | -.30# |
| $MAS_2$ | --- | --- | .45* | .84* | -.09 | -.02 | -.12 | -.11 | -.19 |
| $MAS_3$ | --- | --- | --- | .79* | .22 | .13 | -.19 | -.12 | -.22 |
| $MAS_t$ | --- | --- | --- | --- | .11 | .08 | -.25† | -.13 | -.28# |
| $SCAT_v$ | --- | --- | --- | --- | --- | .73* | -.25† | .00 | -.21 |
| $SCAT_q$ | --- | --- | --- | --- | --- | --- | -.13 | .11 | -.10 |
| $SCAT_t$ | --- | --- | --- | --- | --- | --- | --- | .22 | .88* |
| GPA | --- | --- | --- | --- | --- | --- | --- | --- | .60* |
| FPTG | --- | --- | --- | --- | --- | --- | --- | --- | --- |

*p = < .001 #p = < .05 †p = < .10

4. $SCAT_v$ and $SCAT_t$ scores are negatively related, but with significance beyond the .10 level of confidence only.
5. $SCAT_q$ and $SCAT_t$ scores are negatively related, but the finding is not a significant one.
6. All correlations between MAS scores and GPA are negatively related, but not significantly so.
7. SCAT scores tend to be positively correlated with GPA, but the results do not approach significance.
8. All MAS scores are negatively correlated with FPTF. In two cases the correlation is beyond the .05 level of confidence.
9. $SCAT_v$ and $SCAT_q$ are negatively correlated with FPTG, but the findings are not significant.
10. $SCAT_t$ and FPTG are positively correlated, with significance beyond the .001 level of confidence.
11. GPA and FPTG scores reveal a correlation significant at the .001 level but, as noted above, this relationship is spuriously high.

*Discussion*

The high and positive correlations between the various subtests of the MAS with each other and with $MAS_t$ were to be expected. However, the correlations between $SCAT_v$ and $SCAT_q$ and the relation each of these bears to $SCAT_t$ comes as a surprise. One would not have expected a correlation of the magnitude of .73 between the verbal and quantitative scores of the SCAT, as these subtests supposedly measure quite different abilities. Further, inasmuch as the $SCAT_v$ and $SCAT_q$ scores contribute to the $SCAT_t$ score, it is surprising to find negative scores between the two subtest scores and the total score. The relationships between all MAS scores and SCAT scores are in the expected direction if we assume that high scores in anxiety would interfere with, or depress, measures of academic ability. A similar, negative relationship is noted between anxiety scores and measures of academic achievement. Again, the direction of the correlation is as we might expect but the magnitude of the findings is not impressive. A similar comment might be made with reference to the relationship between all SCAT scores and GPA. One would imagine that measured academic ability would bear a much closer relationship with final grades in courses taken than is revealed here. Final grades in teaching are negatively related to high scores in anxiety, as might be expected. It is difficult, if not impossible, to explain the correlations noted between SCAT and FPTG scores. Whereas $SCAT_v$ and $SCAT_q$ reveals negative relationships with teaching grades, the total SCAT score shows a very high and positive correlation with final grades in teaching. Indeed, for this group of elementary male teachers, the $SCAT_t$ score is the single best predictor of teaching success.

A comparison of the results of this study with those of the earlier study by Chabassol and Thomas which utilized 124 female elementary teachers is of interest. There are a number of quite remarkable changes in both direction (i.e., sign) and in magnitude of the correlations noted in these two studies. It was found in the present project that the twelve correlations between MAS and SCAT scores were evenly divided between positive and negative results, with two of the negative results significant at the .10 level. In the study involving females, eleven of the twelve correlations were negative, although none was significant. Relationships between SCAT subtest scores and between these scores and $SCAT_t$ differ remarkably in the two studies. The correlation between $SCAT_v$ and $SCAT_q$ was .15 for females, but .73 for males. Again, the correlation between $SCAT_v$ and $SCAT_t$ was .82 for females and -.25 for males, with the former being significant beyond the .001 level of confidence, positively, and the latter significant beyond the .10 level of confidence, in the negative direction. Finally, $SCAT_q$ and $SCAT_t$ scores reveal correlations of .65 for females but -.13 for the present male group. Of the four MAS and FPTG correlations in the earlier study, three were

positive, one was negative, and none was significant. In the present project, all these correlations were negative, and two were significantly so. The most noticeable difference between the two sets of findings relates to the correlation between $SCAT_t$ and FPTG. For the female population the correlation was found to be -.21, but for the present group it was seen to be .88 and, as noted above, the single best predictor for teaching success for males. On the basis of the above comparisons, it can be stated that correlations between SCAT - MAS, SCAT - FPTG, MAS - FPTG, and $SCAT_t$ - FPTG differ quite notiveably, according to the sex of the subjects involved. Those who would predict success in teaching on the basis of scores made on other variables must take into account the sex of the teachers for whom the predictions are being made.

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*Influence and social structures in school organizations are investigated through an analysis of communication and interaction patterns among staff members. It was concluded that this method of analysis need not be confined to case studies nor to small schools, and that is useful as a supplement to methods based on the bureaucratic model.*

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# Analysis of Influence and Social Structures in Schools

Most recent approaches to the analysis of the structural characteristics of schools viewed as organizations have relied heavily upon descriptions which involve bureaucratic or similar dimensions (MacKay, 1964, Kolesar, 1967). Variations in structural characteristics are described in terms of variations in measures obtained from the information which members of the organization provide about the presence or absence of specific characteristics. This research strategy has proven to be useful in yielding insights into the nature of school and school system organization; however, like any single approach, it also suffers from deficiencies as far as providing a complete and accurate portrayal of the object under study.

In the first place, such research tends to focus on a fairly limited aspect of structure, namely on those features most closely related to the formal or deliberately planned parts of the organization. It does not even begin to provide information about the complex network of relationships which develops within the formal framework; that is, it does not offer adequate means for identifying and analyzing significant centres of power and influence or the channels of communication through which influence is exerted. Secondly, in spite of attempts to allow for the interrelatedness of parts and the dynamic character of an organization, research based on the bureaucratic model is struggling essentially with a static

model and presents significant but limited possibilities for contributing to the development of a more comprehensive model of organizations. The research approaches outlined in this paper are not presented as alternatives to the type of research just described. Instead these strategies are proposed because of their possibilities for supplementing and complementing studies of bureaucratic characteristics to provide a more complete description of an organization and expanded possibilities for testing hypotheses about organizational dynamics.

## *Problem and Research Procedures*

The research project described in this paper was based on the assumption that useful information about significant structural characteristics of school organizations can be obtained through the analysis of communication and interaction patterns which develop among members of the school staff.[1] Specifically, the project was designed to study the influence and subgroup structures in relation to the following questions:

a. What are the characteristics of school influence structures, and what are the bases of personal influence?
b. What are the characteristics of task and non-task related subgroup structures?
c. How much overlap is there between task and non-task related structures?

Similar studies have been carried out by Boyan (1951), McCleary (1957), and House (1966) among others; however, in each of these instances the objective of the study was to provide an intensive analysis of a single school. The present study was designed to examine similarities and differences across a sample of schools. Although questions and hypotheses were suggested by previous research, the study was not based on any clearly delimited theorizing about the characteristics of influence and subgroup structures. It will become evident in the report that the study was guided mainly by attempts to test some commonly held notions about the formation of subgroups within larger organizations and about the bases of interpersonal influence.

### *Sample*

The sample for this study consisted of 18 non-city schools whose staff members were willing to participate in the research project. The schools varied in size from 14 to 33 staff members; a variety of types in terms of grade range, from elementary to senior high school, was included. Members of the research team visited all but one of the schools for the purpose of administering the questionnaires; in the one instance responses were obtained by mail. Completed questionnaires were obtained from 389 staff members in the 18 schools, including principals, vice-principals, counsellors, teachers, secretaries, and librarians.

[1] The research project was supported by a grant from the Alberta Advisory Committee for Educational Studies.

*Instrumentation*

The instruments and research procedures used in this study were based upon and were extensions of those described by Blocker, McCabe, and Prendergast (1964). Basic data were provided by the responses of staff members to six sociometric-type questions. Respondents circled the code numbers of all those persons with whom they interacted or communicated in six difference contexts; that is, the data provided six "slices" of interaction patterns in the schools at a particular point in time. The six dimensions: communication, socialization, three reliance dimensions, and attributed influence were defined operationally by these questions:

a. During the course of a typical school week, in school or out of school, with which individuals are you likely to discuss general school matters (teaching duties, school events, etc.)? (General Task Related Communication)
b. With which individuals are you most likely to socialize informally during recesses, during noon hours, and/or before and after school hours? (Socialization)
c. If you had a problem concerning discipline in your classroom from whom would you likely seek advice? (Reliance—Discipline)
d. If you had a problem concerning the organization of teaching materials, teaching methods, tests or assignments, from whom would you likely seek advice? (Reliance—Teaching)
e. If you had a problem concerning the interpretation of school policies and regulations from whom would you likely seek advice? (Reliance—Policies)
f. In your opinion, which individuals in this school are most influential in initiating changes in general school practices such as testing programs, school regulations, school activities, etc.? (Attributed—Influence)

Responses to all but the second question were used in the analysis of influence structures; the first two questions yielded the data for the analysis of subgroup structures.

*Analysis*

The basic procedures which have been developed for the analysis of sociomatrices were applied in this study (Glanzer & Blaser, 1959; Blocker, McCabe & Prendergast, 1964).[2] A sociomatrix was constructed for each question for each school; a *one* was entered in a cell to indicate that communication or interaction had taken place between individuals and a *zero* was entered if no interaction was reported. This first power matrix included all of the primary communication, socialization, reliance, and attributed influence links. For further analysis, only reciprocated links were retained in the first two matrices; these matrices were then squared and cubed to reveal two and three-step channels of communication (Blocker & McCabe, 1964).

[2] Techniques specific to this study are presented in Blocker. Computer programs were prepared by Lawrence Bezeau now with the Department of Elementary Education, The University of Alberta.

Influentials on the communication dimension were determined from column sums in the cubed matrix; these sums revealed the total number of three-step communication links between an individual and all other persons in the school. Column totals were used to rank order staff members and the upper one-fifth of staff members was classed as influential in that school while others were classed as non-influential. An examination of this categorization for all schools indicated that this arbitary procedure provided a reasonably good separation between those individuals who had larger and those with fewer numbers of tertiary communication links.

In order to determine influentials on the reliance dimensions, a subweight substitution method suggested by Blocker and McCabe (1964) was used. Column totals for the first power matrix were considered to be subweights for each individual. These subweights were substituted for non-zero elements in the third power matrix; the columns for this matrix were then summed and each individual's subweight was added to his column total. Staff members were again placed in rank order and those in the upper fifth in each staff were classed as influentials.

Since the attributed influence matrix did not lend itself to expansion as did the others, members were simply ranked on column totals.

The detection of cliques or subgroups has persisted as one of the most intriguing problems in sociometric analysis. Although the inspection of sociograms, the manipulation of rows and columns of the first power matrix, the manipulation of higher power matrices have all proven useful to a point,[3] it is only since the attempts of Wright and Evitts (1951) and MacRae (1960) to factor analyze sociometric data that subgroup detection has been possible for larger groups or organizations. For the purpose of detecting subgroups in the socialization and communication dimensions, the factor analysis procedures suggested by Blocker and his associates were applied and extended (Blocker, McCabe & Prendergast, 1964).

The intercorrelation matrix derived from the third power communication or socialization dimension matrix was subjected to principal axis factor analysis, and iteration was continued until eigenvalues below 1.00 were reached. Through the analysis of results and the examination of independently prepared sociograms it appeared useful to accept a factor loading as low as 0.40 on a varimax rotation as indicative of subgroup membership. Factor analysis results consistently verified independently prepared sociograms for larger schools and contributed greatly to the completion of this task.

## *Results*

### *Influence Structure*

The nature of the influence structures in the schools under study was analyzed in relation to the following questions: Do teachers classed

[3] A review of techniques for the analysis of subgroups is presented in Glanzer and Blaser, pp. 324-328.

as influentials differ from non-influentials on selected professional and personal characteristics? Do persons who are influential on one dimension also tend to be influential on the others? Where are administrators located within the influence structure? Table 1 summarizes the results of t-tests and Chi-square tests used to test hypotheses of no significant differences between influentials and non-influentials.

TABLE 1

SUMMARY OF SIGNIFICANCE OF DIFFERENCE TESTS BETWEEN INFLUENTIALS AND NON-INFLUENTIALS ON SIX CHARACTERISTICS[a]

| Influence Dimension | N[b] | Age | Total Exp. | School Exp. | Years Prep. | Grade Level | Sex |
|---|---|---|---|---|---|---|---|
| General Communication | 77<br>312 | 0.16 | 1.47 | 2.76** | 3.34** | 2.38* | 10.68** |
| Reliance-Discipline | 65<br>324 | 1.15 | 4.49** | 2.70** | 7.20** | 5.28* | 49.21* |
| Reliance-Methods | 71<br>318 | 2.64** | 4.28* | 3.50* | 6.84** | 4.58** | 27.16** |
| Reliance-Policies | 67<br>322 | 1.89* | 3.28** | 2.69** | 4.15** | 2.59* | 28.49** |
| Attributed Influence | 69<br>320 | 0.57 | 2.98** | 2.30* | 7.21** | 4.88** | 41.38** |
| Generalized Influentials | 40<br>349 | 2.47** | 4.14** | 2.95** | 6.54** | 4.39** | -- |

[a] t-test except for Chi-square on sex differences.

[b] Upper value = number of influentials; lower value = number of non-influentials

*p ≤ .05; **p ≤ .01

The results show that there were significant differences on each characteristic selected for at least one influence dimension. When compared with non-influentials, the influential members of teaching staffs have more years of professional preparation, have more years of total and of within school experience, teach at higher grade levels and are more likely to be male than female. This suggests that the bases of influence are similar to those which might be expected in any professionally-staffed organization, namely, expertise insofar as this might

be indicated by preparation, experience, and grade level to which a teacher is assigned. Sex and age may appear significant only because they are related to these other characteristics; however, some cultural factors may also be operative.

The analysis designed to determine whether basically the same individuals were influential on the communication dimension, the three reliance dimensions, and the attributed influence dimension revealed that 56 of 79 possible influentials were influential on three or more task area dimensions. When generalized influentials were defined as those who were influential on four or more task areas, 40 individuals still met this criterion. Table 1 also reveals that generalized influentials differed from all other respondents on variables of age, experience, preparation, and grade level taught; no analysis was carried out for sex.

The location of administrative personnel within the influence structure was determined from the rank order of individuals for each school on each influence dimension. Every principal was found to be influencial on the reliance dimensions and on the attributed influence dimension. Every one of the 18 principals ranked first on the reliance as to discipline dimension, and in most cases the vice-principal ranked second. All but one of the principals ranked first on reliance as to interpretation of school policies while on reliance concerning teaching methods, 14 principals ranked first and 4 ranked second. Only two principals did not rank first on the attributed influence dimension.

Results for the general communication dimension were not as clearly related to administrative position. Of the 14 principals who were classed as being influential on this dimension, 10 ranked first, 3 ranked second, and one was fifth. Ten of 23 vice-principals were influential on this dimension. The results suggest that although principals are consistently high in influence on certain specific aspects of reliance and communication, they do not always hold the highest rank in the more generalized communication and influence structures.

As might be expected, the 18 principals were all classed as generalized influentials as were 16 of 23 vice-principals when generalized influentials were defined as those influential on four or more dimensions. If generalized influentials had been defined as those who were influential and all five dimensions, 14 principals and 6 vice-principals would still have qualified.

The analysis suggests some similarities in the composition of influence structures across schools; designation as principal or vice-principal, and the possession of various professional characteristics are highly related to actual or potential influence. The results of this study are similar to those reported by House (1966) in his intensive analysis of one secondary school. This suggests that further analysis may verify

the possibility of generalizing across schools about influence structure characteristics which may appear initially to be highly specific to a particular school.

*Subgroup Structures*

The distribution of influence and the flow of communication are probably closely related to the subgroup structures within an organization. Although there has been considerable speculation about the configuration of the social structure of schools, there is little research evidence on the formation and characteristics of subgroups within schools. Through factor analytic procedures and the inspection of subgroups, this study attempted to provide some of the basic information which appears to be lacking in research literature.

*Characteristics of subgroup structures.* The analysis revealed considerable variation across schools in terms of the number of subgroups, the size of subgroups, and the relationships between subgroups. The following descriptions were developed in an attempt to identify different types of structures:

a. one generalized subgroup, few isolates, interconnections among all or nearly all members, no focal person.
b. one generalized subgroup in which communication or interaction focused on one particular person.
c. a structure consisting of two or more subgroups in which one is clearly separated from the others.
d. a structure involving two or more subgroups with little overlap in membership.
e. a structure of two or more subgroups with considerable overlap in membership.

The attempt to develop a typology was not highly successful since it yielded few pure types; however, even combinations of these descriptions proved to be useful in outlining the characteristics of the social structure of schools.

The analysis was carried out and descriptions were developed for both the communication and the socialization dimensions. Table 2 includes the classification of schools (identified by code number) by subgroup characteristics. Schools which are described by more than one characteristic are identified. For the schools in this sample, the most frequently occurring structures were two or more groups with either some or considerable overlap in membership. It is interesting to note that the first two characteristics are almost exclusively descriptive of communication and not of socialization structures while the fourth type appears to be repeated within the two dimensions for the same schools.

*Number and size of subgroups.* The number of subgroups in each school and the size of each subgroup were also determined. Table 3

TABLE 2

SCHOOLS CLASSIFIED BY SUBGROUP CHARACTERISTICS ON THE COMMUNICATION AND SOCIALIZATION DIMENSIONS

| Subgroups Characteristics | Dimension | |
|---|---|---|
| | Communication | Socialization |
| 1. One generalized subgroup--no focal person | 4, 15* | 18 |
| 2. One generalized subgroup with focal person | 5*, 7, 8 13*, 15*, 18* | - |
| 3. Two or more subgroups--one isolated | 1*, 6*, 11* | 1*, 5*, 6, 8, 17* |
| 4. Two or more subgroups--little overlap | 1*, 2, 3, 9, 11*, 13*, 14 | 1*, 2, 3, 10, 11, 14, 15, 16, 17* |
| 5. Two or more subgroups--considerable overlap | 5*, 6*, 10, 12 16, 17, 18* | 4, 5*, 7, 9, 12, 13 |

*Each of these schools classified in more than one way.

shows the distribution of 51 communication subgroups and 57 socialization subgroups throughout the 18 schools in the sample. A single communication subgroup was identified in only two schools and a single socialization subgroup identified in only one school. Ten schools had two or fewer communication subgroups while only five had two or fewer socialization subgroups.

As might be expected, the number of subgroups within a school was related significantly to the number of staff members; the larger schools included more subgroups. The rank order correlation coefficient between number of subgroups and number of staff members was .53 for the communication dimension and .56 for the socialization dimension.

A similar test revealed no relationship between the size of subgroups and the number of staff members in the school. The data in Table 4 reveal that for both dimensions more than one-half of the subgroups included six or fewer members. The extremely large groups appear to occur more frequently in the communication than in the socialization dimension.

TABLE 3

FREQUENCY DISTRIBUTION OF SCHOOLS BY NUMBER OF SUBGROUPS IN COMMUNICATION AND SOCIALIZATION DIMENSIONS

| Number of Subgroups | Type of Subgroup | |
|---|---|---|
| | Communication | Socialization |
| 1 | 2 | 1 |
| 2 | 8 | 4 |
| 3 | 5 | 6 |
| 4 | 0 | 5 |
| 5 | 1 | 2 |
| 6 | 1 | 0 |
| 7 | 1 | 0 |

TABLE 4

FREQUENCY DISTRIBUTION OF COMMUNICATION AND SOCIALIZATION SUBGROUPS BY NUMBER OF MEMBERS PER GROUP

| Number of Members | Type of Subgroup | |
|---|---|---|
| | Communication | Socialization |
| 3 or 4 | 13 | 15 |
| 5 or 6 | 14 | 17 |
| 7 or 8 | 8 | 9 |
| 9 or 10 | 2 | 9 |
| 11 or 12 | 5 | 4 |
| 13 or more | 9 | 3 |
| Totals | 51 | 57 |

*Subgroup characteristics.* One further aspect of the analysis of social structure included in this study was determining whether the members of different subgroups in the same school differed on selected characteristics. Because of the relatively small number of individuals within subgroups in any one school, statistical tests were almost meaningless. Only in the case of the largest schools were any statistically significant differences observed. Table 5 presents the results from one school for illustrative purposes. This particular statistical analysis revealed significant differences among subgroups on such average charactertistics as age, total years of professional preparation, and grade level.

TABLE 5

COMPARISON OF SIX COMMUNICATION SUBGROUPS IN TERMS OF MEAN VALUES OF SIX CHARACTERISTICS

| Subgroup Number | No. of Members | Mean Age* | Total Exp. | School Exp. | Years of Prep.* | Grade Level* | Sex[a] |
|---|---|---|---|---|---|---|---|
| 1 | 12 | 26.92 | 6.92 | 4.75 | 3.25 | 9.58 | 1.08 |
| 2 | 5 | 35.60 | 14.20 | 3.60 | 4.40 | 10.00 | 1.40 |
| 3 | 3 | 41.67 | 14.67 | 5.33 | 2.00 | 3.67 | 2.00 |
| 4 | 7 | 27.86 | 10.14 | 7.14 | 3.29 | 10.57 | 1.00 |
| 5 | 3 | 36.00 | 12.00 | 6.33 | 2.00 | 6.33 | 2.00 |
| 6 | 3 | 53.33 | 25.00 | 10.67 | 2.00 | 1.33 | 2.00 |
| Grand Mean | | 33.00 | 11.52 | 5.82 | 3.09 | 8.27 | 1.36 |

*Differences between means significant $p \leq .05$

[a]Male = 1.00; Female = 2.00

Examination of the characteristics of subgroups in schools where two or more subgroups were identified revealed a tendency for subgroups to differ markedly on most of the six characteristics. It appeared that women teachers, who also had greater number of years of teaching experience and a lower number of years of preparation and who were teaching at lower grade levels, interacted with each other on task related matters and also for informal socializing. Younger male staff members who had a greater number of years of preparation but fewer years of experience and who were teaching at higher grade levels also formed exclusive subgroups. In some other schools a subgroup composed of older males, with about the same experience as the female group but with more years of preparation, formed a third type of group. Approximately one-third of the communication subgroups and two-fifths of the socializaton subgroups could readily be assigned to these categories without much distortion.

*Task and Non-Task Related Structures*

An attempt was made to compare the degree of similarity between social structures more closely related to the formal task and those related less directly to the task by comparing communication and socialization structures. One approach in the analysis was to determine the percentage of members which communication and socialization subgroups held in common with subgroups of the other type of the

same or larger size in the same school. The number of subgroups across the 18 schools with percentage of common membership in certain ranges were then tallied and the results are reported in Table 6.

TABLE 6

FREQUENCY DISTRIBUTION OF SUBGROUPS IN COMMUNICATION AND SOCIALIZATION DIMENSIONS BY PERCENTAGE OF OVERLAP IN MEMBERSHIP WITH SUBGROUPS OF SAME OR LARGER SIZE IN OTHER DIMENSION

| Percentage common membership | Subgroup Type | |
|---|---|---|
| | Communication | Socialization |
| 100% | 7 | 14 |
| 80 - 99 | 9 | 13 |
| 60 - 79 | 15 | 17 |
| 40 - 59 | 17 | 11 |
| Under 40 | 16 | 9 |

An examination of the table reveals that socialization subgroups appear to be more completely embedded within communication subgroups of the same or larger size than is true for the reverse. Communication subgroups tend to go beyond the boundaries of particular social subgroups. Apparently communication networks in task related matters include individuals who are excluded from social relations which take place within cliques or subgroups. Further analysis to determine characteristics of those who are excluded might provide useful insights into the nature of the social structure of a school.

In an earlier analysis, Bezeau (1966) applied a different approach to studying the relationship between instrumental (task related) and expressive (non-task related) structures within the same sample of schools. Instead of focusing on subgroups, he compared interaction patterns of individuals on task related communication with those on informal socializing. He observed that variations in similarity were related to certain personal characteristics of staff members. For example, it was observed that females had more congruent instrumental and expressive interaction patterns than did males; that is, females tended to discuss task related matters with the same individuals with whom they interacted socially. To a greater extent, males tended to interact socially with a different set of individuals from those with whom they communicated on more task related matters. It was also observed that the more years of teacher education an individual had, the greater was the difference between his position in the instrumental structure

and his position in the expressive structure. The variables of sex and professional preparation are probably related; the male with more years of preparation is also likely to have supervisory responsibilities and is likely to interact with different groups socially and on task matters.

### *Conclusion*

The results presented in this report suggest that the analysis of subgroup and influence structures in schools need not be restricted to case studies or to small schools. The research procedures and methods of analysis which have been used in restricted studies can be extended to samples of schools and tentative generalizations appear possible. The practicality of the techniques also suggest possibilities for studying changing organizational patterns and relationships in emerging forms of school organization.

It seems evident that many administrative and organizational problems could be better understood as a result of a more complete analysis of organizational structure. Sociometric based studies described in this report should be used to supplement studies based on the bureaucratic model. In addition, social structure characteristics and indices can be used in more theoretically based studies to test hypotheses in which organizational structure is either the dependent or independent variable (Wiens, 1968; Scharf, 1967). An early test of the usefulness of a comprehensive strategy would be a research effort which seeks to obtain information about both social and bureaucratic structural characteristics of schools and which analyzes the relationship between the two.

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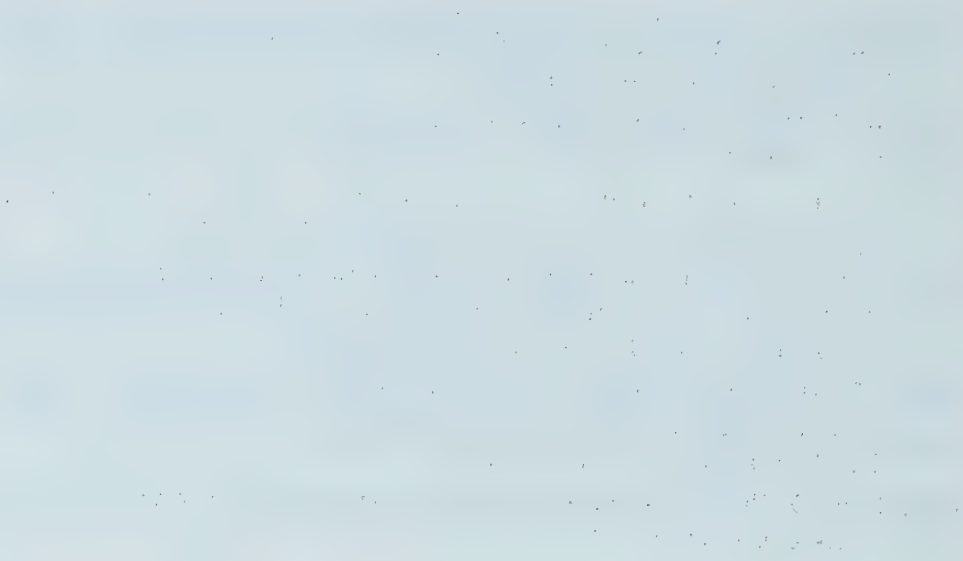

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*This study examines the relationships of academic achievement, athletics, club membership, and dating to the social status of Canadian high school sutdents. The findings suggest cross-cultural differences since high academic performance and high social status are positively related for this sample of Canadian students.*

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# Social Status in the High School: An Analysis of Some Related Variables[1]

The purpose of this study is to examine the relationships of a number of selected variables to the social status of high school students. The concept of social status is defined as a person's rank, standing, or position in a social system. A position of high social status would be one in which a person enjoys prestige and receives deference from others. Social status for high school students, according to Coleman (1961), amounts to recognition and respect from peers.

More specifically, this study compares the leading crowd members and other students in three senior Calgary high schools. Leading crowd membership is treated as a position of high social status in the social structure of the high school. The analysis initially focuses upon the factors associated with high social status and concludes in a cross-cultural examination of the data.

## *Previous Research*

Previous research findings indicate that high social status among American high school students is primarily a function of participation in what has been called the fun subculture (Clark, 1962). More precisely, the empirical data suggest that the value system of the student social structure is strongly non-intellectual, if not in some respects anti-intellectual. In other words, the values which are associated with

1 The present study was supported by a grant in aid from the Alberta Advisory Committee on Educational Research.

high academic achievement and other intellectual endeavours are not as pervasive in the student social structure as those associated with athletics, membership in clubs, and success with members of the opposite sex. Evidence to support this conclusion is derived from sociological studies by Coleman (1961) and Gordon (1957).

On the basis of these previous research findings the following general hypothesis was formulated: *Participation in athletics, membership in clubs and frequent dating are positively associated with high social status for high school students, whereas high academic performance is either not related or negatively related to high social status.* The analysis in this study centers around this general hypothesis.

### *Methodology*

The populations sampled in this study include pupils from three senior high schools in the city of Calgary. These three schools were selected on the basis of their location in residential areas characterized by high, average, and low socioeconomic status. Calgary, the chief urban and industrial center of southern Alberta, had a population of 276,975 persons at the time of this study.[2]

Limitations upon resources precluded surveying all of the students enroled in the three schools. The samples were drawn from each school so that students from Grades 10, 11, and 12 and students classified by the school authorities as high, average, and low achievers be more or less equally represented. These stipulations were substantially realized. The actual school classes selected for inclusion in the sample were chosen on the basis of convenient availability on the day the survey was conducted. The total sample includes 766 students, and these 766 students constitute 38 per cent of the total enrolment in the three schools.

Membership in the leading crowd of each school was determined by simply asking the students to name the members of the group which more or less ran things among the students. The sample of leading crowd members consists of those students who were part of the original sample and were named at least twice by other students as being leading crowd members. The relationship between the sample sizes of the leading crowds and the total number of students named as leading crowd members is reported in Table 1. The percentages in Table 1 show that for both males and females, the samples of the leading crowds include over 60 per cent of all students named as leading crowd members.[3]

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[2] The source of this population figure is the April, 1963 Civic Census. See *Municipal Manual: City of Calgary* (Calgary, Alberta: Compiled by the City Clerk, 1963). P. 75.

[3] The sample size of the leading crowd is high relative to the sample size of the total enrolment because in one of the three schools all the students who were named as leading crowd members also were included in the original sample. This factor combined with leading crowd membership in the other schools being well represented on the original samples accounts for the relatively large leading crowd sample size.

TABLE 1

NUMBER OF STUDENTS NAMES AS LEADING CROWD MEMBERS AND SAMPLE SIZES OF LEADING CROWDS BY SEX

| Sex | Number of Students Named as Leading Crowd Members N | Sample Sizes of Leading Crowds N | Per Cent |
|---|---|---|---|
| Male | 73 | 49 | 67% |
| Female | 105 | 67 | 64% |
| Total | 178 | 116 | 65% |

The data for this study were collected by means of two questionnaires, one for males and one for females. The questionnaires closely resemble in content those utilized by Coleman (1961, pp. 338-356).

The analysis of the data involves primarily the reporting of percentage distributions which facilitate comparisons between the leading crowd members and other students. Chi-square tests of association are utilized in further analysis of the data. The .05 level of significance is the level at which statistical associations are accepted as significant.

## *The Findings*

### *Academic Performance and High Social Status*

The indices of academic performance which are examined include I.Q.'s, quality of achievement as assessed by the school authorities, type of program of study, and amount of time spent doing homework.[4]

*The I.Q.'s of the leading crowd members.* The findings reveal that for both boys and girls, but especially for the boys, leading crowd membership is positively related to having high I.Q.s. The percentages in Table 2 show that students who have high I.Q.s are overrepresented in the leading crowds. Furthermore, those students who have average I.Q.s are underrepresented in the leading crowds.

*Quality of achievement of the leading crowd members.* The findings concerning the quality of achievement of the leading crowd members

[4] The policy within these three schools was to group students into homogeneous classes on the basis of academic achievement. Thus, certain classes were designated as either high, average, or low in academic achievement by the school authorities, and it is on this basis that we obtained a measurement of quality of academic achievement.

TABLE 2

DISTRIBUTION OF LEADING CROWD MEMBERS AND OTHER STUDENTS BY MEASURED I. Q. RATING

| Response Category | Males[a] | | Females[b] | |
|---|---|---|---|---|
| | LCM | OS | LCM | OS |
| High Ratings | 69% | 49% | 55% | 49% |
| Average Ratings | 29% | 43% | 39% | 43% |
| Low Ratings | 2% | 4% | 3% | 3% |
| No Answer | 0% | 4% | 3% | 5% |
| Total | 100% | 100% | 100% | 100% |
| N | 49 | 397 | 67 | 253 |

[a] $x^2 = 6.13$, df = 2, $p \leq 0.05$

[b] $x^2 = 0.62$, df = 2, not significant

relative to the other students are quite similar to the findings about the I.Q.s of the leading crowd members. The percentages in Table 3 show that students who are high achievers are overrepresented and those who are low achievers are underrepresented in the leading crowds. In other words, for both boys and girls the situation is that the leading crowd members are much more likely to be high achievers than low achievers.

*Programs of study of the leading crowd members.* The findings reveal that leading crowd membership for boys is very strongly related to taking the matriculation pattern as a program of study. The percentages in Table 4 show that boys who are taking the matriculation pattern are overrepresented in the leading crowd.

*Amount of time leading crowd members spend doing homework.* For the boys the findings reveal leading crowd membership to be related positively to the average amount of time spent doing homework. The percentages in Table 5 show that boys who do two hours or more homework a day are overrepresented in the leading crowds, and those who do only about one-half hour or less a day are underrepresented.

TABLE 3

DISTRIBUTION OF LEADING CROWD MEMBERS AND OTHER STUDENTS BY QUALITY OF ACHIEVEMENT AT SCHOOL

| Response Category | Males[a] | | Females[b] | |
|---|---|---|---|---|
| | LCM | OS | LCM | OS |
| High Achievement | 59% | 29% | 63% | 33% |
| Average Achievement | 25% | 34% | 31% | 33% |
| Low Achievement | 16% | 36% | 6% | 33% |
| No Answer | 0% | 1% | 0% | 1% |
| Total | 100% | 100% | 100% | 100% |
| N | 49 | 397 | 67 | 253 |

[a] $x^2 = 17.93$, df = 2, $p \leq 0.05$

[b] $x^2 = 26.21$, df = 2, $p \leq 0.05$

TABLE 4

DISTRIBUTION OF RESPONSES OF LEADING CROWD MEMBERS AND OTHER STUDENTS TO THE QUESTION: "WHAT PROGRAM ARE YOU TAKING IN SCHOOL"

| Response Category | Males[a] | |
|---|---|---|
| | LCM | OS |
| Matriculation Pattern | 90% | 66% |
| General | 6% | 22% |
| Vocational, Commercial, or Other | 4% | 12% |
| No Answer | 0% | 0% |
| Total | 100% | 100% |
| N | 49 | 397 |

[a] $x^2 = 11.09$, df = 2, $p \leq 0.05$

Leading crowd membership and average amount of time spent doing homework are almost unrelated for the girls. As the percentages in the table show, the proportions of leading crowd members who do the various amounts of homework closely parallel the proportions of other female students who do similar amounts of homework.

TABLE 5

DISTRIBUTION OF THE LEADING CROWD MEMBERS AND OTHER STUDENTS BY AVERAGE AMOUNT OF TIME SPENT DOING HOMEWORK OUTSIDE SCHOOL

| Response Category | Males[a] | | Females[b] | |
|---|---|---|---|---|
| | LCM | OS | LCM | OS |
| About 1/2 Hour or Less | 10% | 35% | 11% | 12% |
| About 1 to 1 1/2 Hours a Day | 53% | 49% | 55% | 55% |
| About 2 Hours or More a Day | 37% | 16% | 34% | 32% |
| No Answer | 0% | 0% | 0% | 1% |
| Total | 100% | 100% | 100% | 100% |
| N | 49 | 397 | 67 | 253 |

[a] $x^2 = 17.61$, df = 2, $p \leq 0.05$

[b] No Chi-square Statistic

*Participation in the Fun Subculture and High Social Status*

Participation in athletics, club and activity membership, and dating behaviour are analyzed as activities which characterize the fun subculture.

*Athletics and leading crowd membership.* The findings reveal that participation in athletics is related to leading crowd membership for the boys. The percentages in Table 6 show that football and basketball players are overrepresented in the leading crowd. This trend is stronger for football players than basketball players.

For the girls, being interested in athletics and having high social status are strongly associated. Those girls who display a high degree of interest in athletics are consistently overrepresented in the leading crowd. The percentages in Table 7 show that those girls who attended more than half of the home basketball games are overrepresented in the leading crowds. Furthermore, as the percentages in Table 8 show, those girls who show an uncommon interest in athletics by remembering

TABLE 6

DISTRIBUTION OF MALE LEADING CROWD MEMBERS AND OTHER STUDENTS BY WHETHER THEY PLAYED FOOTBALL AND/OR BASKETBALL AT SCHOOL DURING THE YEAR

| Response Category | Football[a] | | Basketball[b] | |
|---|---|---|---|---|
| | LCM | OS | LCM | OS |
| Yes | 41% | 23% | 29% | 15% |
| No | 59% | 76% | 71% | 78% |
| No Answer | 0% | 1% | 0% | 7% |
| Total | 100% | 100% | 100% | 100% |
| N | 49 | 397 | 49 | 397 |

[a] $x^2 = 7.10$, df = 1, $p \leq 0.05$

[b] $x^2 = 4.30$, df = 1, $p \leq 0.05$

the basketball team's won-lost record are overrepresented in the leading crowds. Consequently, showing an interest in athletics is positively related to a girl's chances of being a leading crowd member.

TABLE 7

DISTRIBUTION OF FEMALE LEADING CROWD MEMBERS AND OTHER STUDENTS BY PROPORTION OF HOME BASKETBALL GAMES ATTENDED DURING THE YEAR

| Response Category | LCM | OS |
|---|---|---|
| About Half or Less of Home Games | 40% | 78% |
| More than Half of Home Games | 58% | 19% |
| No Answer | 2% | 3% |
| Total | 100% | 100% |
| N | 67 | 253 |

$x^2 = 39.69$, df = 1, $p \leq 0.05$

TABLE 8

DISTRIBUTION OF FEMALE LEADING CROWD MEMBERS AND OTHER STUDENTS BY WHETHER THEY REMEMBER THE BASKETBALL TEAM'S WON-LOST RECORD

| Response Category | LCM | OS |
|---|---|---|
| Yes | 46% | 14% |
| No | 52% | 83% |
| No Answer | 2% | 3% |
| Total | 100% | 100% |
| N | 67 | 253 |

$x^2 = 32.28$, df = 1, $p \leq 0.05$

*Leading crowd members' participation in clubs and activities.* Fraternity and sorority membership is strongly related to leading crowd membership. In fact, virtually all of the fraternity members are also leading crowd members as the percentages in Table 9 show. This table also shows that sorority members are highly overrepresented in the leading crowd.

TABLE 9

DISTRIBUTION OF LEADING CROWD MEMBERS AND OTHER STUDENTS BY FRATERNITY AND SORORITY MEMBERSHIP

| Response Category | Fraternity Membership[a] | | Sorority Membership[b] | |
|---|---|---|---|---|
| | LCM | OS | LCM | OS |
| Yes | 49% | 6% | 49% | 16% |
| No | 48% | 92% | 46% | 76% |
| No Answer | 3% | 2% | 5% | 8% |
| Total | 100% | 100% | 100% | 100% |
| N | 33 | 302 | 67 | 253 |

[a] $x^2 = 62.25$, df = 1, $p \leq 0.05$

[b] $x^2 = 31.82$, df = 1, $p \leq 0.05$

As well as frequently being sorority members, the female members of the leading crowd tend to be those girls who have frequent or very frequent membership in clubs and activities in school. The percentages in Table 10 show that those female students who have frequent or very frequent membership in clubs and activities in school are overrepresented in the leading crowds.

TABLE 10

DISTRIBUTION OF FEMALE LEADING CROWD MEMBERS AND OTHER STUDENTS BY FREQUENCY OF MEMBERSHIP IN CLUBS AND ACTIVITIES IN SCHOOL

| Response Category | LCM | OS |
|---|---|---|
| Infrequent or No Club or Activity Membership | 52% | 77% |
| Frequent or Very Frequent Membership | 48% | 23% |
| No Answer | 0% | 0% |
| Total | 100% | 100% |
| N | 67 | 253 |

$x^2 = 16.26$, df = 1, $p \leq 0.05$

*Dating by leading crowd members.* Frequent or very frequent dating is fairly widespread among leading crowd members compared to the other students, particularly for the girls. The percentages in Table 11 show that both male and female students who date frequently or very frequently are overrepresented in the leading crowds; going steady, on the other hand, is not strongly related to leading crowd membership. As the percentages in Table 12 show, boys and girls who go steady are slightly overrepresented in the leading crowds, but the results are not statistically significant.

## *Interpretation of the Findings*

### *Rejection of the General Hypothesis*

The main conclusion of this study is that the general hypothesis is not supported by the current findings. High academic performance is closely associated with high social status for high school students. Compared to the other students, the leading crowd members are more likely to have high I.Q.s and less likely to have average I.Q.s; furthermore, the leading crowd members are more likely to be high achievers than low achievers. As well, the boys in the leading crowds take the matriculation program more frequently than other students do, and a higher

TABLE 11

DISTRIBUTION OF LEADING CROWD MEMBERS OF OTHER STUDENTS BY FREQUENCY OF DATING

| Response Category | Males[a] | | Females[b] | |
|---|---|---|---|---|
| | LCM | OS | LCM | OS |
| Infrequently or Never Date | 45% | 65% | 29% | 41% |
| Frequently or Very Frequently Date | 53% | 32% | 71% | 56% |
| No Answer | 2% | 3% | 0% | 3% |
| Total | 100% | 100% | 100% | 100% |
| N | 49 | 397 | 67 | 253 |

[a] $x^2 = 8.30$, df = 1, $p \leq 0.05$

[b] $x^2 = 3.90$, df = 1, $p \leq 0.05$

TABLE 12

DISTRIBUTION OF LEADING CROWD MEMBERS AND OTHER STUDENTS BY WHETHER THEY GO STEADY

| Response Category | Males[a] | | Females[b] | |
|---|---|---|---|---|
| | LCM | OS | LCM | OS |
| Yes | 23% | 16% | 34% | 29% |
| No | 55% | 59% | 61% | 67% |
| No Answer | 22% | 25% | 5% | 4% |
| Total | 100% | 100% | 100% | 100% |
| N | 49 | 397 | 67 | 253 |

[a] $x^2 = 1.06$, df = 1, not significant

[b] $x^2 = 0.90$, df = 1, not significant

proportion of boys in the leading crowds than other students do two or more hours of homework a day.

There are factors other than academic performance which are associated with high social status. For boys, being an athlete, and for girls, a display of interest in athletics, is associated with high social status. Fraternity and sorority membership also is related to high social status. Active involvement in clubs and activities is also associated with high social status for girls. Frequent or very frequent dating is related to high social status for both boys and girls. To go steady, however, has little association with high social status.

### *Different Sources of High Social Status for American and Canadian Students*

Since the general hypothesis which is not substantiated by the current findings is directly based on previous research evidence, it follows that the results of this study must be in at least partial disagreement with previous research findings. More precisely, the current findings do not tend to support certain conclusions proposed by Coleman about social status in the student social structure. Athletics for boys in this study is not as strongly associated with high social status as Coleman's evidence suggests. Furthermore, high academic performance has a very pervasive position in the student social structure which tends to dispute Coleman's claim concerning the nonintellectual nature of the students' attitudes.

What accounts for the variation between the current findings and the situation as depicted by Coleman for American high school students? It should be pointed out that Coleman relies heavily upon indices which attempt to measure the students' orientations and attitudes toward intellectual pursuits to document the nonintellectual nature of the student social structure. In contrast, in this study measurements of actual academic performance are utilized. In other words, qualitatively different types of measurement indices of the academic dimension are used in these two studies. It is suggested that this factor might account for some of the variation in obtained results.

This, however, cannot be considered a completely adequate explanation since some of Coleman's findings indicate that the leading crowd members, relative to the other students, tend to be high achievers. There appears to be a discrepancy between the values which the American students profess concerning intellectual endeavours and actual academic accomplishments. Unless such a discrepancy does in fact exist, the implication is that Coleman's measurements of the students' values may not be completely reliable when viewed in a cross-cultural perspective. That is, perhaps the student social structure in the high school is not as uniformly and strongly non-intellectual in orientation as Coleman suggests.

On the basis of the findings of this study it can be argued that the student social structures in these three schools are positively oriented toward intellectual pursuits. If the students were generally negatively oriented to academic success, it would seem very unlikely that they would accord students who are high in academic performance the high social status which accompanies leading crowd membership. In every instance for both boys and girls, those students who were high achievers were overrepresented in the leading crowds. Surely, such would not be the case unless the students in general possess positive attitudes toward academic success and strive for high academic performance.

Another possible interpretation of the findings of this study in relation to Coleman's findings is based on the concept of cross-cultural variations. It is possible that the differences in findings appear because of cultural differences between the United States and Canada. This implication is worthy of further investigation. Downey's (1960) study of regional variations within the United States and between the United States and Alberta regarding the role of the school would suggest that such differences could exist.[5] Downey found that Canadians placed greater emphasis on knowledge, scholarly attitudes, creative skills, aesthetic appreciation, and morality as outcomes of schooling than did Americans. In contrast the Americans emphasized physical development, citizenship, patriotism, social skills, and family living much more than did Canadians. Given the kind of cross-cultural differences suggested above, it does not seem at all surprising that the sample of Canadian students is much more pervasively oriented to academic accomplishment and less involved in athletics than their American counterparts. It is postulated that the prescribed role of the school in Alberta has not to the same extent produced an atmosphere conducive to the development of student values which are characteristic of the fun subculture in American high schools. The nature of the role of the school in Alberta, it would appear, orients the students to intellectual pursuits and academic performance more readily than does the American school.

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[5] It has also been suggested that Canada is somewhat less egalitarian, less achievement oriented, and less individualistic than the United States. See Seymour M. Lipset, *The First New Nation* (New York: Basic Books, Inc., 1963). Pp. 248-273.

# BOOK REVIEW

## NEW LOOK AT EDUCATION

*By: John Pfeiffer* (New York: *The Odyssey Press, 1968*).

This little (162 pages) book carries the subtitle "Systems Analysis in our Schools and Colleges." The author, who has written several popularized scientific works (e.g. *The Changing Universe, Thinking Machine, From Galaxies to Man*), prepared this work with the cooperation of Educational Testing Service. It purports to be an introduction to systems analysis which, in the author's own words, "nonspecialists can understand and which provides a number of clear examples." Since this is what the author set out to accomplish, the book must stand or fall on these two criteria of simplicity and clarity.

As far as simplicity is concerned, this book does measure up as a useful introductory work. The author summarizes the systems approach to planning and decision making and provides a series of so-called models which describe the systems analysis process. These models, which are really flow charts depicting steps or phases in the process, are easily understood by anyone who is familiar with the classical description of the decision-making process.

On the second count, the book has some strengths, but also some serious weaknesses. There is a profusion of examples drawn from a number of systems analysis projects which have been implemented in schools and universities. Brief descriptions of these projects do serve to underline the growing importance of systems analysis as a technique in education, but their very brevity makes them unsuitable as basic learning materials in this important area of study. Moreover, because the projects used a wide variety of techniques all of which are comprehended under the umbrella term "systems analysis," the reader may have some difficulty in drawing any but the most abstract generalizations from the descriptions. That is to say, one can discern the major steps in the "systems analysis process" in each of the projects; however, having done so, one has not really seen much more than the fact that systems analysis is a rational process which seeks the best solution for a given problem. Anyone familiar with the reconstructed logic of the scientific method or with the classical description of decision-making will not find anything new in this level of generalization.

The reason for the confusion, which these examples may leave in one's mind, is to be found in the fact that systems analysis is based on an interdisciplinary approach. The philosophical insights of general systems theory, the work of economists, planners, cyberneticions, and the special skills of operations researchers, are all part of the "bag" of the systems analyst. With this in mind, it should be understandable and

even forgivable when an introductory book suffers from lack of specificity with regard to the actual use of the techniques.

Two further points should be noted. There is the danger in using books of this kind that a reader may come away with the notion that he now "knows" what systems analysis is. Like every work which simplifies complex subject areas for the "millions," this one could stand in the way of a thorough, albeit demanding, study of the concepts and procedures associated with systems analysis. Finally, the book suffers from what must be termed a fatal weakness in an introductory work. There is no bibliography and no references are provided for the reader whose interest in this area is aroused for the first time.

In spite of its weaknesses, this book, if properly used, can serve to arouse the interest of both practitioners and researchers. If interest is aroused, the libraries of our universities abound with books and journal articles which can provide a solid basis in this relatively new, but already important, field of study.

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## THE WORLD EDUCATIONAL CRISIS: A SYSTEMS ANALYSIS

*By: Philip H. Coombs (Toronto: Oxford University Press, 1968)*

The crisis referred to in the title is that since the 1950's, although student enrolments have doubled in many countries and educational expenditures have more than doubled, there is an *increase* in the number of adult illiterates in the world. Coombs attributes this crisis to three major causes: scarcity of resources (building, equipment, teachers), conservatism in education (an unwillingness to change), and the unwillingness of society to adapt (as when developing countries which need technical and vocational education attach undue prestige to academic and professional preparation). He proposes systems analysis as a framework for diagnosis and strategy.

Most readers will be familiar with the general outlines of systems analysis. In Coombs' presentation the educational process is thought of as a system, whose resource inputs are aims and priorities, students, management, structure and time schedule, content, teachers, learning aids, facilities, technology, quality controls, research, and costs. The outputs are more difficult to measure. A crude index of output is the number of students who complete various phases. A much more pertinent, but vastly more elusive output is the attitudes, values, and motivations of students. Still another, probably still more elusive, is the number and kind of leaders and innovators. The manpower output is im-

portant in the economy: are there enough people with the proper preparation to perform the work of society? Other outputs are research, to increase the store of knowledge and to solve problems, and international understanding.

Many economists talk in terms of systems and "input — output", and in this day and age, when in Canada education absorbs 8% of the Gross National Product, the economists have shown ever increasing interest in education and its costs! Coombs does not fall into the trap which others seem to. He recognizes the complexities, and refuses to select only the simple, measurable inputs and outputs. While this complicates a systems analysis of education, it avoids a biased and warped presentation. One of the reactions one gets from reading this book is the fairness and balance in Coombs' views. He refuses to oversimplify the complex.

An illustration of this fairness and balance is found in his discussion of money as an educational input.

> The questions about financial resources posed above cannot be divorced from their environment; education is but one part of a seamless web of things that make up life in a society. At any given time, the society's economy has just so much income to deploy. The amount that goes to education is subtracted from the amounts available for other purposes. For these reasons, the claims of education on national resources encounter the competitive counter claims of important material needs, such as investment in agriculture and industry, roads and housing, and important social needs, such as health, old age security, and unemployment relief. Regrettable, education's toughest adversary in more than a few countries is the military budget. But education even divides against itself in a competition for resources—where the rivals may be primary education versus secondary, or secondary versus university; expanded teacher training versus expanded construction of classrooms; and, of special importance, formal education versus nonformal.
>
> This competition demands the formulation of an order of national priorities, whether explicitly or implicitly. The settling of national priorities, however, especially where equally strong arguments produce a deadlock in reason itself, is a notoriously painful affair. The matter can be greatly aided by solid facts, rationally analyzed. But in the end the priorities are finally set, not by a planner's slide rule, but by a political process—a process sometimes marked by rough-and-tumble budget battles among ministries, or between them and legislatures, or within legislatures. What finally emerges usually reflects a blend of the values of the society, and the comparative strengths and strategies of contending pressure groups. Indeed, precisely on this account, it is important for educational leaders to master not only their own field but the language and techniques of economists as well, in order to be better armed for the defense of their own proposals in the annual 'battle of the budget.' Good rhetoric is no substitute for facts and analysis in winning these battles.

More than half of the book is devoted to the input-output systems analysis, but it also includes lengthy sections on nonformal education, international cooperation, and conclusions for strategy. A few of these latter are: modernized management, modernized teachers, modernized learning process, the strengthening of education finance, greater emphasis on nonformal education, and international cooperation. These, Coombs says, will help solve the world educational crisis.

The manuscript was originally prepared as a paper to be presented at the President's Invitational Conference on the World Crisis in Education (Williamsburg, Virginia, October, 1967). In its mimeographed form it had 212 pages with a technical annex of an additional 69 pages. The preface to the original version (but not included in the book) notes that the manuscript was prepared by invitation following a meeting of "eighteen distinguished educational leaders, from eighteen different countries." This preface emphasizes that the presentation is an *analysis,* not a statement of *policy.* The author, as director, generously acknowledges the contributions made by the staff of the International Insitute for Educational Planning, a UNESCO organization located in Paris. The book closely follows the original paper.

Readers should be warned that the title "*World* Educational Crisis" correctly describes the breadth and vision included in Coombs' treatment of the topic.

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